WHAT IS CLAIMED IS:

1. A method of selecting polynucleotides which encode an intracellular immunoglobulin molecule, or fragment thereof, whose expression induces a modified phenotype in a eukaryotic host cell, comprising:

(a) providing a population of eukaryotic host cells capable of expressing said intracellular immunoglobulin molecule, or fragment thereof, wherein individual host cells of said population can be induced to exhibit a predetermined modified phenotype;

(b) introducing into said population of host cells a first library of polynucleotides encoding, through operable association with a transcriptional control region, a plurality of first intracellular immunoglobulin subunit polypeptides, each comprising a first immunoglobulin variable region selected from the group consisting of a heavy chain variable region and a light chain variable region;

(c) introducing into said population of host cells a second library of polynucleotides encoding, through operable association with a transcriptional control region, a plurality of second intracellular immunoglobulin subunit polypeptides, each comprising a second immunoglobulin variable region selected from the group consisting of a heavy chain variable region and a light chain variable region, wherein said second immunoglobulin variable region is not the same as said first immunoglobulin variable region, and wherein said second intracellular immunoglobulin subunit polypeptides combine with said first intracellular immunoglobulin subunit polypeptides to form a plurality of intracellular immunoglobulin molecules, or fragments thereof;

(d) permitting expression of said plurality of intracellular immunoglobulin molecules, or fragments thereof in said population of host cells under conditions wherein said modified phenotype can be detected; and

(e) recovering polynucleotides of said first library from those individual host cells which exhibit said modified phenotype.

2. The method of claim 1, further comprising:

(f) providing a population of eukaryotic host cells capable of expressing said intracellular immunoglobulin molecule, or fragment thereof, wherein individual host cells of said population can be induced to exhibit a predetermined modified phenotype;

(g) introducing said polynucleotides recovered from said first library into said population of host cells;

(h) introducing into said population of host cells said second library of polynucleotides;

(i) permitting expression of said plurality of intracellular immunoglobulin molecules, or fragments thereof in said population of host cells under conditions wherein said modified phenotype can be detected; and

(j) recovering polynucleotides of said first library from those individual host cells which exhibit said modified phenotype.

3. The method of claim 2, further comprising repeating steps (f)-(j) one or more times, thereby enriching for polynucleotides of said first library which encode a first intracellular immunoglobulin subunit polypeptide whose expression, as part of an intracellular immunoglobulin molecule, or fragment thereof, induces said modified phenotype.

4. The method claim 1, further comprising isolating those polynucleotides recovered from said first library.

5. The method of claim 4, further comprising:

(k) providing a population of eukaryotic host cells capable of expressing said intracellular immunoglobulin molecule, or fragment thereof, wherein individual host cells of said population can be induced to exhibit a predetermined modified phenotype;

(l) introducing into said population of host cells said second library of polynucleotides;

(m) introducing into said population host cells said first polynucleotides isolated from said first library, wherein the intracellular immunoglobulin subunit polypeptides encoded by said isolated first polynucleotides combine with said second intracellular immunoglobulin subunit polypeptides encoded by said second library of polynucleotides to form a plurality of intracellular immunoglobulin molecules, or fragments thereof;

(n) permitting expression of said plurality of intracellular immunoglobulin molecules, or fragments thereof in said population of host cells under conditions wherein said modified phenotype can be detected; and

(o) recovering polynucleotides of said second library from those individual host cells which exhibit said modified phenotype.

6. The method of claim 5, further comprising:

(p) providing a population of eukaryotic host cells capable of expressing said intracellular immunoglobulin molecule, or fragment thereof, wherein individual host cells of said population can be induced to exhibit a predetermined modified phenotype;

(q) introducing said polynucleotides recovered from said second library into said population of host cells;

(r) introducing into said population of host cells said first polynucleotides isolated from said first library, wherein the intracellular immunoglobulin subunit polypeptides encoded by said isolated first polynucleotides combine with the second intracellular immunoglobulin subunit polypeptides encoded by said polynucleotides recovered from said second library, to form a plurality of intracellular immunoglobulin molecules, or fragments thereof;

(s) permitting expression of said plurality of intracellular immunoglobulin molecules, or fragments thereof in said population of host cells under conditions wherein said modified phenotype can be detected; and

(t) recovering polynucleotides of said second library from those individual host cells which exhibit said modified phenotype.

7. The method of claim 6, further comprising repeating steps (p)-(t) one or more times, thereby enriching for polynucleotides of said second library which encode a second intracellular immunoglobulin subunit polypeptide whose expression, as part of an intracellular immunoglobulin molecule, or fragment thereof, induces said modified phenotype.

8. The method of claim 5, further comprising isolating those polynucleotides recovered from said second library.

9. The method of claim 1, wherein said intracellular immunoglobulin molecule, or fragment thereof is derived from a human immunoglobulin molecule.

10. The method of claim 1, wherein said first intracellular immunoglobulin subunit polypeptide comprises a heavy chain variable region.

11. The method of claim 10, wherein said first intracellular immunoglobulin subunit polypeptide further comprises a heavy chain constant region, or fragment thereof.

12. The method of claim 11, wherein said second intracellular immunoglobulin subunit polypeptide further comprises a light chain constant region, or fragment thereof.

13. The method of claim 1, wherein said first intracellular immunoglobulin subunit polypeptide comprises a light chain variable region.

14. The method of claim 13, wherein said light chain variable region is a kappa variable region.

15. The method of claim 13, wherein said light chain variable region is a lambda variable region.

16. The method of claim 13, wherein said first intracellular immunoglobulin subunit polypeptide further comprises a light chain constant region, or fragment thereof.

17. The method of claim 16, wherein said second intracellular immunoglobulin subunit polypeptide further comprises a heavy chain constant region, or fragment thereof.

18. The method of claim 1, wherein said first library of polynucleotides is introduced into said population of eukaryotic host cells by means of a eukaryotic virus vector.

19. The method of claim 1, wherein said second library of polynucleotides is introduced into said population of eukaryotic host cells by means of a eukaryotic virus vector.

20. The method of claim 5, wherein said first polynucleotides isolated from said first library are introduced into said population of eukaryotic host cells by means of a eukaryotic virus vector.

21. The method of claim 1, wherein said second library of polynucleotides is introduced into said population of eukaryotic host cells by means of a plasmid vector.

22. The method of claim 18, wherein said population of eukaryotic host cells are infected with said first library at a multiplicity of infection ranging from about 1 to about 10, and wherein said second library is introduced under conditions which allow up to 20 polynucleotides of said second library to be taken up by each infected host cell.

23. The method of claim 5, wherein said first polynucleotides isolated from said first library are introduced into said population of eukaryotic host cells by means of a plasmid vector.

24. The method of claim 18, wherein said eukaryotic virus vector is an animal virus vector.

25. The method of claim 19, wherein said eukaryotic virus vector is an animal virus vector.

26. The method of claim 24, wherein said vector is capable of producing infectious virus particles in mammalian cells.

27. The method of claim 26, wherein the naturally-occurring genome of said vector is DNA.

28. The method of claim 26, wherein the naturally-occurring genome of said vector is RNA.

29. The method of claim 27, wherein the naturally-occurring genome of said vector is linear, double-stranded DNA.

30. The method of claim 29, wherein said vector is selected from the group consisting of an adenovirus vector, a herpesvirus vector and a poxvirus vector.

31. The method of claim 30, wherein said vector is a poxvirus vector.

32. The method of claim 31, wherein said poxvirus vector is selected from the group consisting of an orthopoxvirus vector, an avipoxvirus vector, a capripoxvirus vector, a leporipoxvirus vector, an entomopoxvirus vector, and a suipoxvirus vector.

33. The method of claim 32, wherein said poxvirus vector is an orthopoxvirus vector selected from the group consisting of a vaccinia virus vector and a raccoon poxvirus vector.

34. The method of claim 33, wherein said poxvirus vector is a vaccinia virus vector.

35. The method of claim 34, wherein said host cells are permissive for the production of infectious virus particles of said vaccinia virus vector.

36. The method of claim 34, wherein said vaccinia virus vector is attenuated.

37. The method of claim 36, wherein said vaccinia virus vector is deficient in D4R synthesis.

38. The method of claim 31, wherein said transcriptional control region of said first library of polynucleotides functions in the cytoplasm of a poxvirus-infected cell.

39. The method of claim 21, wherein said plasmid vector directs synthesis of said second immunoglobulin subunit in the cytoplasm of a poxvirus-infected cell through operable association with a poxvirus-derived transcriptional control region.

40. The method of claim 38, wherein said transcriptional control region comprises a promoter.

41. The method of claim 40, wherein said promoter is constitutive.

42. The method of claim 41, wherein said promoter is a vaccinia virus p7.5 promoter.

43. The method of claim 42, wherein said promoter is a synthetic early/late promoter.

44. The method of claim 40, wherein said promoter is a T7 phage promoter active in cells in which T7 RNA polymerase is expressed.

45. The method of claim 38, wherein said transcriptional control region comprises a transcriptional termination region.

46. The method of claim 18, wherein said first library of polynucleotides is constructed by a method comprising:

(a) Providing a population of host cells permissive for the production of infectious viral particles of said eukaryotic virus vector;

(b) cleaving an isolated linear DNA fragment comprising the genome of said eukaryotic virus vector to produce a first viral fragment and a second viral fragment, wherein said first fragment is nonhomologous with said second fragment;

(c) providing a population of transfer plasmids comprising polynucleotides encoding said plurality of first intracellular immunoglobulin subunit polypeptides through operable association with a transcription control region, wherein each of said polynucleotides is flanked by a 5' flanking region and a 3' flanking region, wherein said 5' flanking region is homologous to said first viral fragment and said 3' flanking region is homologous to said second viral fragment;

(d) introducing said transfer plasmids and said first and second viral fragments into said population of host cells under conditions wherein each of said transfer plasmids, said first viral fragment, and said second viral fragment undergo *in vivo* homologous recombination, thereby producing a population of viable modified virus genomes, each comprising a polynucleotide which encodes a first intracellular immunoglobulin subunit polypeptide; and

(e) recovering said population of modified virus genomes.

47. The method of claim 19, wherein said second library of polynucleotides is constructed by a method comprising:

(a) Providing a population of host cells permissive for the production of infectious viral particles of said eukaryotic virus vector;

(b) cleaving an isolated linear DNA fragment comprising the genome of said eukaryotic virus vector to produce a first viral fragment and a

second viral fragment, wherein said first fragment is nonhomologous with said second fragment;

(c) providing a population of transfer plasmids comprising polynucleotides encoding said plurality of second intracellular immunoglobulin subunit polypeptides through operable association with a transcription control region, wherein each of said polynucleotides is flanked by a 5' flanking region and a 3' flanking region, wherein said 5' flanking region is homologous to said first viral fragment and said 3' flanking region is homologous to said second viral fragment;

(d) introducing said transfer plasmids and said first and second viral fragments into said population of host cells under conditions wherein each of said transfer plasmids, said first viral fragment, and said second viral fragment undergo *in vivo* homologous recombination, thereby producing a population of viable modified virus genomes, each comprising a polynucleotide which encodes a second intracellular immunoglobulin subunit polypeptide; and

(e) recovering said population of modified virus genomes.

48. The method of claim 1, wherein said population of eukaryotic host cells is adherent to a solid support and wherein said modified phenotype is nonadherence.

49. The method claim 48, wherein said nonadherence is due to an inhibition of an essential function by said intracellular immunoglobulin molecule, or fragment thereof.

50. The method of claim 48, wherein said population of eukaryotic host cells each comprise a suicide gene in operable association with a non-constitutive promoter, and wherein said nonadherence is due to expression of said suicide gene from said promoter.

51. The method of claim 50, wherein said non-constitutive promoter is selected from the group consisting of: a differentiation-induced promoter, a cell type-restricted promoter, a tissue-restricted promoter, a temporally-regulated promoter, a spatially-regulated promoter, a proliferation-induced promoter, and a cell-cycle specific promoter.

52. The method of claim 48, wherein said population of eukaryotic host cells is not yeast cells, wherein each of said host cells further comprises a suicide gene in operable association with a regulatory region as part of a two-hybrid system, and wherein said nonadherence is due to expression of said suicide gene from said regulatory region.

53. The method of claim 1, wherein said population of eukaryotic host cells each comprise a polynucleotide encoding a cell surface antigen in operable association with a non-constitutive promoter, and wherein said modified phenotype is expression of said cell surface antigen.

54. The method of claim 53, wherein expression of said cell surface antigen is detected by binding of an antibody specific for said cell surface antigen.

55. The method of claim 1, wherein said population of eukaryotic host cells each comprise a polynucleotide encoding a cell surface antigen in operable association with a non-constitutive promoter, and wherein said modified phenotype is reduced expression of said cell surface antigen.

56. The method of claim 55, wherein reduced expression of said cell surface antigen is detected by a reduction in binding of an antibody specific for said cell surface antigen.

57. The method of claim 1, wherein said modified phenotype is altered susceptibility to an infectious agent.

58. The method of claim 1, wherein said modified phenotype is altered drug sensitivity.

59. The method of claim 1, wherein each of said first library of polynucleotides further comprise a heterologous polynucleotide, wherein said heterologous polynucleotide is common to each polynucleotide in said first library.

60. The method of claim 59, wherein said heterologous polynucleotide encodes a heterologous polypeptide fused to each of said first intracellular immunoglobulin subunit polypeptides.

61. The method of claim 60, wherein said heterologous polypeptide is a targeting sequence.

62. The method of claim 61, wherein said targeting sequence is capable of localizing said intracellular immunoglobulin molecule, or fragment thereof, to a subcellular location selected from the group consisting of a golgi, an endoplasmic reticulum, a nucleus, a nucleoli, a nuclear membrane, a mitochondria, a chloroplast, a secretory vesicle, a lysosome, and a cellular membrane.

63. The method of claim 60, wherein said heterologous polypeptide is an epitope tag.

64. The method of claim 63, wherein said epitope tag is selected from the group consisting of a myc epitope, a BSP biotinylation target sequence of the

bacterial enzyme BirA, a tag derived from a protein of the influenza virus, β-galactosidase, glutathione-S-transferase (GST), or a detectable fragment of any of said epitope tags.

65. The method of claim 60, wherein said heterologous polypeptide is a 6-His tag.

66. A kit for the identification of an intracellular immunoglobulin molecule, or fragment thereof, whose expression results in a modified phenotype in a eukaryotic host cell, comprising:

(a) a first library of polynucleotides encoding, through operable association with a transcriptional control region, a plurality of first intracellular immunoglobulin subunit polypeptides, each comprising a first immunoglobulin variable region selected from the group consisting of a heavy chain variable region and a light chain variable region, wherein said first library is constructed in a eukaryotic virus vector;

(b) a second library of polynucleotides encoding, through operable association with a transcriptional control region, a plurality of second intracellular immunoglobulin subunit polypeptides, each comprising a second immunoglobulin variable region selected from the group consisting of a heavy chain variable region and a light chain variable region, wherein said second immunoglobulin variable region is not the same as said first immunoglobulin variable region, wherein said second intracellular immunoglobulin subunit polypeptides combine with said first intracellular immunoglobulin subunit polypeptides to form a plurality of intracellular immunoglobulin molecules, or fragments thereof, and wherein said second library is constructed in a eukaryotic virus vector; and

(c) a population of eukaryotic host cells capable of expressing said intracellular immunoglobulin molecule or fragment thereof, wherein individual host cells of said population can be induced to exhibit a predetermined modified phenotype;

wherein said first and second libraries are provided both as infectious virus particles and as inactivated virus particles, and wherein said inactivated virus particles are taken up by said host cells, which said first and second intracellular immunoglobulin subunit polypeptides, but do not undergo virus replication; and

wherein polynucleotides encoding said first and second intracellular immunoglobulin subunit polypeptides are recoverable from individual host cells which exhibit said modified phenotype.

67. An intracellular immunoglobulin, or fragment thereof, produced by the method of claim 1.

68. A composition comprising the intracellular immunoglobulin, or fragment thereof of claim 67, and a pharmaceutically acceptable carrier.

69. A method of selecting polynucleotides which encode a single-chain intracellular immunoglobulin whose expression induces a modified phenotype in a eukaryotic host cell, comprising:

(a) providing a population of eukaryotic host cells capable of expressing said single-chain intracellular immunoglobulin, wherein individual host cells of said population can be induced to exhibit a predetermined modified phenotype;

(b) introducing into said host cells a library of polynucleotides encoding, through operable association with a transcriptional control region, a plurality of single-chain intracellular immunoglobulins, each comprising a heavy chain variable region;

(c) permitting expression of said plurality of single-chain intracellular immunoglobulins in said host cells under conditions wherein said modified phenotype can be detected; and

(d) recovering polynucleotides of said library from those individual host cells which exhibit said modified phenotype.

70. The method of claim 69, wherein said heavy chain variable region is camelized.

71. The method of claim 69, wherein each of said plurality of single-chain intracellular immunoglobulins further comprises a light chain variable region.

72. The method of claim 69, further comprising:

(e) providing a population of eukaryotic host cells capable of expressing said single-chain intracellular immunoglobulin, wherein individual host cells of said population can be induced to exhibit a predetermined modified phenotype;

(f) introducing the polynucleotides recovered in (d) into said host cells;

(g) permitting expression of said single-chain intracellular immunoglobulins encoded by said recovered polynucleotides in said host cells under conditions wherein said modified phenotype can be detected; and

(h) recovering polynucleotides of said library from those individual host cells which exhibit said modified phenotype.

73. The method of claim 72, further comprising repeating steps (e)-(h) one or more times, thereby enriching for polynucleotides of said library which encode a single-chain intracellular immunoglobulin whose expression induces said modified phenotype.

74. The method of claim 69, further comprising isolating those polynucleotides recovered from said library.

75. The method of claim 71, wherein said heavy chain variable region and said light chain variable region are directly linked.

76. The method of claim 71, wherein each of said plurality of single-chain intracellular immunoglobulins further comprises a peptide linker which joins said heavy chain variable region and said light chain variable region.

77. The method of claim 69, wherein each of said plurality of single-chain intracellular immunoglobulins further comprises a heavy chain constant region domain.

78. The method of claim 71, wherein each of said plurality of single-chain intracellular immunoglobulins further comprises a heavy chain constant region domain.

79. The method of claim 71, wherein each of said plurality of single-chain intracellular immunoglobulins further comprises a light chain constant region domain.

80. The method of claim 69, wherein each of said plurality of single-chain intracellular immunoglobulins further comprises a leucine zipper.

81. A kit for the identification of a single-chain intracellular immunoglobulin whose expression induces a modified phenotype in a eukaryotic host cell, comprising:

(a) a library of polynucleotides encoding, through operable association with a transcriptional control region, a plurality of single-chain intracellular immunoglobulins, each comprising a heavy chain variable region, wherein said library is constructed in a eukaryotic virus vector; and

(b) a population of eukaryotic host cells capable of expressing said single-chain intracellular immunoglobulin, wherein individual host cells of said population can be induced to exhibit a predetermined modified phenotype;

wherein a polynucleotide encoding said single-chain intracellular immunoglobulin is recoverable from individual host cells which exhibit said modified phenotype.

82. The kit of claim 80, wherein each of said plurality of single-chain intracellular immunoglobulins further comprises a light chain variable region.

83. A single-chain intracellular immunoglobulin produced by the method of claim 69.

84. A composition comprising the single-chain intracellular immunoglobulin of claim 83, and a pharmaceutically acceptable carrier.